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Assessing the Information Needs of Health Professionals: An Annotated Bibliography

Compiled and Annotated by

Laura A. Baird, M.S.

Edited by

Faith A. Meakin, Susan Bailey, Jean P. Shipman

National Network of Libraries of Medicine,
Southeastern/Atlantic Region

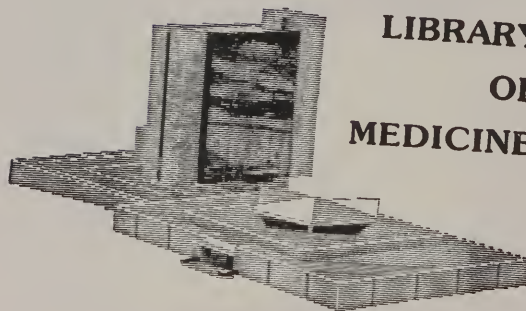
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Assessing the Information Needs of Health Professionals: An Annotated Bibliography

This annotated bibliography was compiled for the purpose of identifying literature relevant to health professionals' information-seeking behaviors, information needs, and information-gathering skills.

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INTRODUCTION

The practice of medicine, medical education and biomedical research all rely on information. In 1989, an Outreach Planning Panel was convened by the National Library of Medicine (NLM) to examine methodologies for meeting information demands of practitioners in all health fields and in all environments. Their report, Improving Health Professionals' Access to Information, was submitted to NLM's Board of Regents and has become the cornerstone of a new outreach effort. The report outlines methods for responding to information needs of all health professionals regardless of institutional affiliation, geographic location or specialty. This current outreach initiative has expanded the role of the health science librarian and increased the importance of defining information needs so appropriate programs and services may be implemented.

Collecting, organizing and disseminating information has long been the objective of health science librarians. And, in order to meet the information needs of health professionals, librarians must understand their information-seeking behaviors and skills. The purpose of this bibliography is to provide a thorough overview of work that has been done in the area of health professional information needs assessment. Citations included are references to literature in both health and information science.

The bibliography is intended for health professionals, teachers, students, and members of the library and information science community who want to understand the information needs of health professionals. It is our hope that it will be used to make further scholarly contributions to the burgeoning field of health professional information needs assessment.

SCOPE

Information need is a difficult concept to identify, isolate, define, and assess, and the information needs of all health professionals have not been widely examined. Most of the research has focused primarily on physicians, while the information needs of allied health professionals, such as medical technicians, occupational therapists and nutritionists, have often been overlooked.

This bibliography was compiled to include literature that assesses the information needs, preferences, and seeking strategies of all health care professionals. It is a review of the English language materials published since 1985, however a few earlier works are included due to their merit. The various methodologies used in studying health professionals' information needs are noted in the annotations.

CONTENT

Only literature which states or implies the concept of "information-seeking behaviors," "information needs," or "information-gathering skills" of various health professionals, as defined in this bibliography, is included. Judgments as to the reliability of the methods used and the validity of the findings reported did not enter into the selection of citations. The body of the literature is heavily weighted in journal articles. Scholarly monographs on the subject are rare and further scholarly research publications are needed.

Because of the overwhelming amount of literature available and slight difference in scope, works in which the primary focus is on continuing medical education or medical informatics have been omitted. Foreign language materials have also been excluded.

A literature search on "information needs" or "information-seeking behaviors" revealed that while these subjects have been written on extensively, no generally accepted definitions exist. The terms "information use," "information gathering," "information seeking," "information needs," "information behaviors," "user needs," and "information skills" are all used interchangeably by different indexing sources. Therefore, a List of Key Terms is included to assist in better understanding some of the terminology used in the annotations.

ARRANGEMENT

The body of the bibliography is arranged alphabetically by author. Multiple citations by a single author are listed in reverse chronological order. Following the annotations, the citations are listed chronologically by year. Two appendices are included: citations published before 1985 (Appendix A) and a list of general works in the field of information needs assessment with no particular focus on type of user (Appendix B). Authors listed in the appendices are not included in the Author Index which follows. Authors are listed with their corresponding citation (not page) numbers in the Author Index.

SEARCH STRATEGY

The following types of materials were consulted when searching for works in this field: audio-visuals, books, conference publications, continuing education courses, dissertations, grants, journal articles, reports, unpublished materials, bibliographies, footnotes and many online databases. While many different databases and database systems were searched for relevant material, half of the references were identified using the many MEDLARS databases.

ONLINE LITERATURE SOURCES SCREENED

Books in Print
Conference Papers Index
Current Contents Search™
Dissertation Abstracts Online
EMBASE
ERIC (Educational Resources Information Center)
GPO Publications Reference File
GRANTS database
HEALTH PERIODICALS DATABASE™
Information Science Abstracts
LIBRARY LITERATURE online
LIBRARY AND INFORMATION SCIENCE ABSTRACTS online
Magazine Index™
MEDLARS® databases: AVLINE®, HEALTH®, MEDLINE®, CANCERLIT®,
CATLINE®
NTIS online
CINAHL® (Nursing & Allied Health Literature Index online)
OCLC™ Online Computer System
PsycINFO® (Psychological Abstracts online)
Readers Guide to Periodical Literature
SCISEARCH®
SOCIAL SCISEARCH®
SOCIOLOGICAL ABSTRACTS online

STYLE

Literature citations in this bibliography are formatted according to the National Library of Medicine Recommended Formats for Bibliographic Citation.¹ This bibliographic format is based on the ANSI citation style.

1. **Patrias, K.** *National Library of Medicine Recommended Formats for Bibliographic Citation*. U.S. Department of Health and Human Services. Public Health Service. National Institutes of Health. Bethesda, MD. 1991 April.

LIST OF KEY TERMS

Information need	Knowledge craved, demanded or required.
Information seeking	The process by which users identify and choose information. Part of a problem-solving process which varies according to an individual user's need.
Information-seeking skill	The natural or acquired ability, competence, or proficiency to obtain the information sought.
Information-seeking behavior	Characteristics exhibited during the process of identifying and choosing information to satisfy a need.
User need	Condition in which something (information) is necessary or desirable and is required or wanted.
Information gathering	Activity of bringing together or accumulating the materials which are desired or needed.
Health professionals	Including, but not limited to: addiction counselors, allied health professionals, dentists, dietitians, health professionals in group practices, health professional internists and students, medical technologists, mental health counselors, nurses, occupational therapists, personnel in private health care organizations, pharmacists, physical therapists, physicians, public health employees, radiological technologists, social service personnel, and social workers.
Information services	The utility, assistance, or aid provided in receiving information.

Assessing the Information Needs of Health Professionals: An Annotated Bibliography

1. Abate MA, Jacknowitz AI, Shumway JM. Pharmacists' use of online information sources. Morgantown (WV): West Virginia University, 1991. Grant R01-LM-0-5189.

This grant will study community pharmacists', clinical pharmacists', and senior pharmacy students' attitudes toward and use of online information sources to answer drug information questions. The study will evaluate and compare online access to health information through the use of Grateful Med and BRS Colleague and will analyze the information needs of pharmacists as well as potential barriers to the widespread use of computer databases by these professionals in West Virginia. It will also address how online computer systems can best be integrated into their daily routines. Descriptive and statistical methods will be used to interpret the study's data.

2. Abate MA, Jacknowitz AI, Shumway JM. *Information sources utilized by private practice and university physicians*. Drug Information Journal 1989; 23:309-19.

The object of this study was to determine which drug information sources private practice and university-affiliated West Virginia physicians used over a three-year period. An initial interview and a drug information sources utilization survey were administered. Of 196 physicians surveyed, on the average, each received approximately 3.3 drug-related questions a day and spent 16 minutes searching for information to answer the questions. Physicians Desk Reference (PDR) was the most popular source of drug information used. Hospital libraries and pharmacists were rarely consulted as a source of drug information. Similarly, none of the respondents reported using online literature searches as an information source. The findings also indicate that the physicians in private practice utilized pharmaceutical manufacturers' promotional literature and sales representatives as a source of drug information more often than the university-affiliated physicians. Recommendations are made for physicians to take advantage of the vast number of online information databases and drug information sources currently available to them.

3. Abate MA, Shumway JM, Jacknowitz AI, Sinclair G. *Recording and evaluating end-user searches on a personal computer*. Bulletin of the Medical Library Association 1989 Oct;77(4):381-3.

The authors recapitulate the results of a one-year study designed to record and evaluate end-user searches performed using BRS Colleague and Dialog Medical Connection to access online health information. Using PROCOMM, a method was

developed to automatically record all aspects of computer searches performed by the study group in an unsupervised setting. The primary purpose for studying the searching behaviors of clinical pharmacists, physicians in private practice and their nurses, was to examine the drug information needs and information-seeking behaviors of these private practice health care professionals. Some proposals for the future use of information retrieval systems are presented.

4. **Beckman M.** *The importance of measuring library effectiveness.* Bibliotheca Medica Canadiana 1987;8(4):180-9.

This paper was presented as the keynote address at the first annual meeting of the Ontario Hospital Libraries Association held at the Women's College Hospital, Toronto, Ontario, on October 28, 1986. Beckman addressed the importance of measuring and evaluating library effectiveness. To measure library effectiveness, she emphasized two actions: identification of library users' information needs and provision of effective library/information services. She reported physicians meet their information needs by consulting the following sources (in order of use): collections, colleagues, experts in the field, and libraries. Availability, accessibility, reliability, relevance, timeliness, portability, and environment are seven variables she identified that are used to determine the effectiveness of library/information services.

5. **Bonham MD.** *BIREME: Latin American and Caribbean Health Sciences Information Center.* Bulletin of the Medical Library Association 1990 Apr;78(2):119-23.

BIREME (Biblioteca Regional de Medicina) is a regional information center based at the Paulista School of Medicine in Sao Paulo, Brazil, and functions as the headquarters for a cooperative network that provides services to meet the information needs of health professionals in 18 Latin American and Caribbean countries. Existing for more than 20 years, BIREME initially used online databases, such as MEDLINE, to satisfy information requests. However, recognizing a need for access to locally available literature in 1980, BIREME started producing LILACS (Literatura Latinoamericana e Caribe em Ciencias de la Saude), which incorporates literature published in Latin America not represented in most commercial online databases. The database coverage includes books, journals, theses, technical reports and government documents with a special emphasis on tropical diseases. Only 36 of these sources are available on the MEDLINE database. Indexing for the database is trilingual and includes many public health concepts. Through online access to this database and MEDLINE, Latin American health professionals can obtain relevant, applicable information to meet their information needs. In addition to LILACS, this article highlights other services BIREME provides for health care professionals.

6. **Bowes F 3d.** *Response to paper by R. Brian Haynes, M.D., Ph.D.: organizing and accessing the literature.* Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):691-8.

Bowes, Director of Publishing Operations at the New England Journal of Medicine, states that the information needs of health professionals are varied. From the point of view of those trying to develop information products and tools to meet these needs, Bowes states "there needs to be much more market study of both the 'perceived' and 'true' specific information needs of clinicians." Focusing on some of the problems of producing new information tools to support the information needs of physicians, Bowes considers the dilemmas of cost recovery, "true" and "perceived" information needs, and the incentives needed to get physicians to adopt new information tools into their present habits.

7. **Braude RM.** *Role of libraries in medical education.* Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):704-27.

This paper was given in the Role of Libraries in Medical Education Panel at the Symposium on the Future of Information Systems for the Medical Sciences held on April 25, 1988. Braude addresses librarians' participation in providing medical education and their successes in doing so. Two roles librarians of today need to fulfill are those of educator and information sifter. He recognizes the need to teach information seeking, critical analysis and information management skills through curriculum integration. Braude outlines several future information needs and provides methods for responding to them.

8. **Brember VL, Leggate P.** *Linking a medical user survey to management for library effectiveness: I, the user survey.* The Journal of Documentation 1985 Mar; 41(1): 1-14.

In this article the authors review the results of the Oxford study conducted by the British Library Research and Development Department, Medical Review Panel. The Oxford study population consisted of 685 clinical participants from the National Health Service medical staff and university medical staff in teaching hospitals and 297 participants from pre-clinical university departments to make a total of 982 participants. The objective was to identify the participants' information needs, information-seeking behaviors, library use patterns, and attitudes toward libraries in non-rural settings. Data collection was accomplished by six different methods to ensure an objective outcome. Methods included interviews, surveys, direct observation and record analysis. An important finding was that the information-seeking behavior patterns of participants were directly related to the amount of time the users devoted to clinical practice versus research. The results of the surveys were applied to library management decision making. Recommendations are made to further study library users' information needs in order to provide more effective library services.

9. **Brodman E.** *The physician as consumer of medical literature.* Bulletin of the New York Academy of Medicine 1985 Apr;61(3):266-74.

Brodman divides physicians into subgroups: researchers, urban practitioners, and rural practitioners. She points out not all physicians' needs are alike and that it is a difficult task for library and information science professionals to fulfill these needs. The economics of information access by physicians is also discussed. Finally, she asks whether physicians with their hectic schedules will utilize future technological information tools to their maximum potential.

10. **Bruer JT.** *Response to paper by R. Brian Haynes, M.D., Ph.D.: organizing and accessing the literature.* Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):687-90.

In his response to the Haynes paper, Bruer concentrates on the information needs of one set of end-users: office-based physicians. He draws heavily on the results of the Louis Harris Study conducted for the New York Academy of Medicine on the Future of Information Systems for the Medical Sciences, and contrasts it with Haynes' conclusions. Bruer points out that the strategies to help health professionals find the best current information recommended by Haynes are in conflict with what clinicians actually do. Recommendations are made to consider human factors when designing information products.

11. **Bryant SL.** *Exploiting the information network in support of health education.* Journal of the Institute of Health Education 1987;25(4):132-9.

In this article, Bryant describes health educators' lack of information-seeking skills and reasons for their unmet information needs. She claims health educators are inundated with a wealth of health information that is not all quality literature. Health educators are not taught information-seeking skills in the health education curriculum, and therefore lack the ability to acquire information proficiently. She suggests that if health professionals' information-seeking skills were improved during health education training, they would be better equipped to seek health information. This would better prepare them to assist the public in understanding and improving its health. Various information sources that are available to health educators to meet their information needs are cited.

12. **Bryant SL.** *Bridging the gap between information and health: the role of an information broker.* Health Education Journal 1986;45(3):180-2.

The establishment of the Health Education/Information Officer (HE/IO) post within the Croydon, Health Education Department (Great Britain) provided an opportunity to support the information needs of health educators. The duties of the HE/IO are to provide information services, library supervision, instruction in the use of library materials, and to promote public health. This article describes how

the HE/IO developed workable methods for accessing and disseminating information which assists in promoting public health in Croydon.

13. **Bunyan LE, Lutz EM.** *Marketing the hospital library to nurses.* Bulletin of the Medical Library Association 1991 Apr;79(2):223-5.

A "marketing audit" of nurses was conducted at the Saint Thomas Medical Center in Akron, Ohio by the medical library staff to determine nurses' information-seeking skills and information needs. The objective of the audit was to determine how the library could better serve the hospitals' nursing community. The nurses reported several reasons for not using the library: they had no time to leave the nursing station, they were unaware they were allowed to use the library, and that the library was not open during their shift. The survey was sent to 363 registered nurses in this 400-bed hospital. The results highlighted a need to heighten awareness of library sources. New services, altered techniques for providing existing services, and promotional tools were established as a result of the survey.

14. **Burger DJI, van Brakel PA.** *Information transfer strategies for military medical practitioners.* South African Journal of Library and Information Science 1988 Jun;56(2):73-88.

A study was conducted to determine the information needs of the military medical practitioners in the South African Defense Force's Medical Services. An empirical questionnaire surveyed 1,689 military medical practitioners. Civilian and enlisted practitioners of the South African Defense Force were studied; paramedical staff and dentists were excluded. The survey gathered information on users' personal profiles and participants' opinions of the medical literature and medical library services. An important finding was that this diverse group of medical staff had differing information needs, making it difficult for the two medical libraries to fulfill all users' needs. The authors make a direct association between a medical practitioner's background and information needs. Geographical barriers to libraries and colleagues were also cited as deterrents to obtaining information. Information transfer strategies were developed from the results of this research. Recommendations are made to improve library services to meet the identified information needs. Extension services and enhanced training for both users and medical librarians are two examples.

15. **Burrows S, Ginn DS, Love N, Williams TL.** *A strategy for curriculum integration of information skills instruction.* Bulletin of the Medical Library Association 1989 Jul;77(3):245-51.

This paper describes how the Louis Calder Memorial Library at the University of Miami School of Medicine incorporated an information-seeking skills instruction program into the orientation curriculum. Core library skills, basic informa-

tion tools and subject-specific skills are taught using both printed and computerized information sources. Benefits of using the curriculum integration approach include: skills reinforcement, improved problem-solving abilities, better critical thinking, and enhanced communication skills. The problems of achieving curriculum integration of information-seeking skills are also identified and discussed.

16. **Cahan MA.** *Grateful Med: a tool for studying searching behavior.* Medical Reference Services Quarterly 1989 Winter;8(4):61-79.

In a three-month beta test of Grateful Med, version 4.0, the Welch Medical Library of The Johns Hopkins University School of Medicine studied the information-seeking behaviors and information needs of Grateful Med testers. An evaluative questionnaire was completed by 83 users (a copy is included in the article). Through the use of a search log built into the software, the staff examined the search techniques employed by the Grateful Med users. Analysis of the more than 1,300 searches conducted showed that the majority of the Grateful Med searches were performed in the MEDLINE database; the average search cost was \$2.33; and users downloaded approximately 15 citations per search. The primary conclusion showed that Grateful Med users in the test did not utilize the end-user system features to their maximum potential.

17. **Caras N.** *Serving the information and professional development needs of the allied health professional.* North Carolina Medical Journal 1989 Dec;50 (12):708-9.

In this article, the North Carolina Area Health Education Centers (AHEC) Library and Information Services (LIS) Network is described as providing health care professionals with information and educational services to support their information needs. One of the AHEC staff members, an allied health coordinator, is responsible for providing educational support services to allied health personnel throughout North Carolina. Each of the nine AHEC locations has an allied health coordinator who, through his or her affiliation with the designated schools of medicine, serves as a link to provide outreach information services to rural and underserved areas. The services and programs provided by the AHEC offer AMA continuing medical education credit and are accredited to meet legal and professional requirements.

18. **Carmel M.** *Health information in the Third World: initiatives and problems.* Health Libraries Review 1989;6:110-11.

Carmel identifies health care problems and health information needs in developing countries, pointing out that currently health care professionals in Third World countries carry a heavy burden of providing quality health care with limited or no information resources. One method of effectively providing up-to-date medical information sources has been the Selective Medical Libraries on Microfiche project

implemented by the Rockefeller Foundation. A second method has been the inception of the National Focal Point Libraries, set up with the guidance of the World Health Organization. The author suggests this is just a beginning and that additional libraries need to be established.

19. Carmel M. *Impact and image: improving the library's contribution.* Health Libraries Review 1986 Jun;3(2):94-100.

This is a paper presented at the Medical, Health and Welfare Group Conference in Coventry, Great Britain, July 5 - 7, 1985. It addresses the question of how the library should fulfill the information needs of members of its parent institution. In fulfilling these information needs, the library should focus on understanding the organization, taking on its priorities, improving its contribution, and making an impact in the organization.

20. Carmel M. *Users of biomedical libraries.* Health Libraries Review 1986 Mar;3(1):28-34.

This article gives an overview of how the South West Thames Regional Health Authority, located in Guildford, Britain, conducted a series of studies into the library needs of primary health care staff. The results include research, spanning over a decade, into user needs in the health care professions in Britain. Three library use trends were recognized. First, clinical information needs in clinical care have taken precedence over research and education. Second, professional groups, other than physicians, have been more vocal in demanding library services geared to their needs. Finally, primary and community health care have emerged as areas with unique interdisciplinary information needs. Additional studies examined the information needs of community nurses, family doctors, and paramedical staff in the community. In conclusion, the author outlines how health science librarians can alter their services to respond to user needs.

21. *CD-ROM: providing quick access to volumes of information.* Nursing Educators Microworld 1990 Aug-Sep;4(6):46.

The authors suggest that currently nurses do not have adequate access to information resources. Yet, they believe that nurses take advantage of those information resources readily available to them. This brief article discusses CD-ROM technology, a new information source, and the benefits it brings to the nursing community. CD-ROMs are examined to determine how they satisfy nurses' information needs and whether they are cost-effective resources.

22. Childs SM. *General practitioners' use of NHS libraries.* Health Libraries Review 1988 Jun;5(2):76-92.

The National Health Service in England consists of 14 regions. The South West Thames Regional Health Authority (SWTRHA) is one of these regions. This paper is a report on the findings of the SWTRHA Community Health Information Project. Ten libraries were surveyed to assess the information needs of the community health care staff. A comparative study of the various health care professionals' information needs found that mainly general practitioners, nurses, and visitors use the National Health Service Libraries regularly. Although the subject range included in these groups was broad, many of the information needs were for rare, obscure or current topics, or for controversial information. The results of the research were used to modify and promote regional libraries in order to meet these information needs.

23. Connelly DP, Rich EC, Curley SP, Kelly JT. *Knowledge resource preferences of family physicians.* The Journal of Family Practice 1990 Mar;30(3):353-9.

The authors conducted an investigation of 126 family physicians in community practice. They examined the information-seeking behavior of these physicians by studying 11 types of knowledge resource preferences. The use, value, and cost of contemporary knowledge resources available in clinical practice were investigated through a self-administered questionnaire. The study focused on the relationship between the information-seeking behavior of family physicians and patient care decision making. The authors stress that it is important to understand how clinicians decide to seek additional knowledge for patient care decisions and how they choose among the resources available to them. Resource cost variables, clinical availability and applicability of the information to the problem appeared more influential than factors relating to the quality of the resource. The most frequently consulted source of information was the Physicians Desk Reference (PDR) which was used daily. PDR was also considered the most readily available resource.

24. Corcoran-Perry S, Graves J. *Supplemental-information-seeking behavior of cardiovascular nurses.* Research in Nursing and Health 1990 Apr;13(2):119-27.

This study reports the information needs and the supplemental information-seeking behaviors of cardiovascular nurses in three metropolitan hospitals. Supplemental information is defined here as "that which is not available from memory and could be made available by computer." Using the Krikelas model of information-seeking behavior (ISB) as a structure for investigating the supplemental-ISB of 46 cardiovascular nurses, 175 instances of supplemental-ISB in four broad types of supplemental information were found. The supplemental sources included patient-specific data, institution-specific facts, domain knowledge and procedural material. Overall, all of the nurses reported seeking patient-specific data most often. Institution-specific information was the second most sought after supplemental information. The study also examined nurses' reasons

for seeking supplemental information, the external information sources they relied upon, and the problems they encountered. The findings provided a base for designing a nursing information system to assist nurses who must make clinical decisions quickly in complex situations.

25. **Covell DG, Uman GC, Manning PR.** *Information needs in office practice: are they being met?* Annals of Internal Medicine 1985 Oct;103(4):596-9.

An investigation into the information needs of physicians in daily practice was performed by studying the perceived needs of 46 physicians in Los Angeles during their patient encounters. Three methods of investigation were used. After each patient visit, the physicians completed a forty-item closed response questionnaire. This was followed by an in-office interview with the physician. At the end of the day, a closing interview was conducted. An important finding of the self-reported study revealed that physicians used print sources, such as drug compendiums, most often to meet their information needs. Computerized information sources and consultation with other health professionals were reported to be used least often. In contrast, the results reported in the interviews revealed that physicians most frequently refer to other physicians for resource information. Approximately 30 percent of their questions were answered by another physician and 70 percent of their questions raised during patient visits were left unanswered. The physicians responded that in their office libraries, their textbooks were outdated and journal collections too disorganized to consult for answers. The kinds of information physicians need and the methods and sources available to fulfill these needs are discussed in detail.

26. **Cunningham D, Grefsheim S, Simon M, Lansing PS.** *Biotechnology awareness study, part 2: meeting the information needs of biotechnologists.* Bulletin of the Medical Library Association 1991 Jan;79(1):45-52.

This article is part two of a study funded by the National Library of Medicine and conducted by the staff of the Southeastern/Atlantic Regional Medical Library Program and the University of Maryland at Baltimore Health Sciences Library. The purpose of this part of the study was to identify whether the nine health sciences libraries surveyed sufficiently met the information needs of biotechnologists working at the affiliated institutions. In the study, librarians were surveyed. The information sources they used to answer biotechnology questions were compared to the sources biotechnologists cited as their resource choices. A list of journals and online databases in the field of biotechnology is included in the article. The results revealed that a minimal number of biotechnology questions were asked of the reference librarians surveyed. The authors conclude there is a need for in-

creased marketing of information professionals' expertise to the biotechnology community. For part 1 of this study, see Grefsheim, S.

27. **Curley SP, Connelly DP, Rich EC.** *Physicians' use of medical knowledge resources: preliminary theoretical framework and findings.* Medical Decision Making 1990 Oct-Dec;10(4):231-41.

Using a self-administered questionnaire, 228 internal medicine and family practice physicians were studied to evaluate their use of, selection of, and feelings about the cost-benefit features of nine knowledge resources. Resources included general medicine textbooks, computerized bibliographic databases, colleagues, medical subspecialty textbooks, Index Medicus, colleagues in other specialties, research, clinical manuals, and review articles. The authors' intent was to understand these physicians' knowledge-seeking behaviors and their reasons for seeking specific information sources in clinical problem solving. Overall, they found physicians refer to clinical colleagues most frequently and use indexing systems least often. This study also evaluated the cost-benefit analysis of knowledge resources.

28. **Dalrymple PW.** *CD-ROM MEDLINE use and users: information transfer in the clinical setting.* Bulletin of the Medical Library Association 1990 Jul;78(3):224-32.

The findings provided here are from a study of health professionals' information-seeking patterns, using six versions of MEDLINE on CD-ROM in seven different health care clinical settings. Participants were not given any training or assistance at the time of the study. In hospitals, third and fourth-year medical students were found to be the most frequent users. In academic medical libraries, first and second-year medical students were the largest group of users. The physical location of the CD-ROM terminal made a significant impact on who used the system. Dalrymple concludes, that access to information sources must be "compatible with the information-seeking patterns of health professionals." She says that as a profession, librarians need to develop information sources that will prove effective and easy for health professionals to use. She explains her theory of information-seeking as a communications process, *i.e.*, a process of health professionals communicating with the information sources they need. The factors associated with designing and developing information technologies are also discussed.

29. **DaRosa DA, Ross D, Folse R.** *The way we teach information-seeking skills.* Medical Teacher 1985;7(3-4):297-300.

Using a problem-based approach exercise as part of medical students' surgery clerkships at the Southern Illinois University School of Medicine, the students assessed their own information-seeking skills in comparison to those of an expert information seeker (librarian). The authors' study

revealed what earlier studies suggested, that medical students are not good information seekers, and that they are in need of additional formal information-seeking skills training to support their information needs. This exercise was a positive experience for both the medical students and librarians.

30. **Dee CR.** Information needs of the rural physician: a descriptive study. [Dissertation]. Florida: The Florida State University; 1990 Fall. 266 p.

The information needs and information-seeking behaviors of 12 rural physicians in Central Florida were studied. Towns with a population of less than 25,000 were considered rural. Rural physicians' information needs, information-seeking behaviors, prescribing practices, continuing education sources, and use of technology were studied. Computerized library networks, end-user searching, and libraries' delivery of information were also discussed in this dissertation.

31. **Demas JM, Ludwig LT.** *Clinical medical librarian: the last unicorn?* Bulletin of the Medical Library Association 1991 Jan;79(1):17-27.

This paper describes and evaluates the clinical medical librarian (CML) program and the impact it has on the information-seeking patterns of health care professionals. Questionnaires returned from 79 clinical medical personnel and 40 medical school library directors were used to study medical school directors' and clinical department heads' attitudes toward the establishment of a CML program. The study examined eight attitudinal elements: the participants' feelings toward the implementation of a CML program; the influence on information-seeking patterns of health care professionals; ethical issues; CML extension services; the costs of the CML program; and, the effect of implementation on patient care, on education, and on research. The findings suggest the attitudes of the two groups are quite different. The authors conclude that there is an increase in health care professionals' information needs and that if properly structured, the implementation of a clinical medical librarian program could fulfill those needs.

32. **Elayyan RM.** *The use of information by physicians.* International Library Review 1988 Apr;20(2):247-65.

Elayyan presents a review of the literature on physicians' information needs and use. The studies included vary in terms of objectives, techniques, populations, scope, and quality. The author argues that studies on information needs are actually about information use and that only a few of them distinguish between the two concepts. This review of the literature is divided into five parts: the concept of information use; relevant bibliographies and reviews; the use of library-related sources of information

by physicians; the use of non-library related sources by physicians; and, the factors affecting physicians' information use. Included are 93 references from 1960 to 1989 on the topic of information use.

33. Forsythe DE, Osheroff JA, Buchanan BG, Miller RA. Expanding the concept of medical information: an observational study of physicians' information needs. Pittsburgh, PA: University of Pittsburgh, Intelligent Systems Laboratory, Computer Science Department; 1990 Aug. 33 p.

The concept and meaning of "information" is discussed in relation to identifying and interpreting the information needs of physicians. The authors criticize the methods that have been used to study information needs as inadequate and present evidence to show that such methods do not sufficiently measure information needs. This study examines the information needs of academic physicians and trainees in internal medicine. The basic data-gathering technique, a variant of participant observation, was used to study information needs in four clinical settings in a university teaching hospital. Use of computerized information sources to fulfill information needs is discussed.

34. Freedman H. *A survey of the use of Withington Hospital Medical Library*. Health Libraries Review 1985;2(2):69-78.

A two-part questionnaire survey was developed to assess the use/non-use of the Withington Hospital Library in England. The survey population consisted of staff and students of this large teaching hospital. The first questionnaire surveyed the library's effectiveness in providing services to the hospital community. The second survey identified the specific types of information demanded by committed library users. Although the necessity of having a library on site was confirmed, the study suggests that it is not possible for a single hospital library to satisfy all users' needs. Survey results pointed out the need for an organized regional resources sharing network of health sciences libraries; library promotion among nurses; and provision of library skills training.

35. *The future of information systems for the medical sciences: a symposium*. Bulletin of the New York Academy of Medicine 1989 Jul-Aug; 65(6): 639-738.

This special issue of the Bulletin of the New York Academy of Medicine is devoted to papers presented at the symposium and responses to these papers. Papers from this symposium, as well as the study itself, are listed separately in this bibliography. See: Braude, Bowes, Bruer, Haynes, Huth, Lorenzi and Louis Harris and Associates, Inc.

36. Garfield E. *The impact of health information delivery on the quality of patient care: whither medical information science?* Health Libraries Review 1985;2(4):159-69.

This article describes several conventional hospital libraries and the role the libraries play in providing quality cost-effective health care services. The purpose of the hospital library is defined and defended. Garfield considers the impact of health information and medical libraries on patient care and the health care system, and discusses his thesis that "medical information is a requirement for cost-effective delivery of health care." Garfield recommends incorporating the teaching of information-seeking skills into medical school curriculum.

37. **Glockner B.** *The information needs of medical practitioners in Western Australia.* Health Information: New Directions. Proceedings of the Joint Conference of the Health Libraries Sections of the Australian Librarian and Information Association and New Zealand Library Association; Auckland, New Zealand; Nov 12-16, 1989:349-358.

Due to the number of requests for health science information received at King Edward Memorial Hospital Library not related to obstetrics or gynecology, a survey was conducted in Western Australia to study the information-seeking behavior of medical practitioners in the Perth metropolitan area and doctors practicing in the country. The objective of the study was to determine why rural health professionals were contacting a subject specific library for general health science information. Glockner also wanted to identify "reasons for the medical practitioners' information needs." Studying 100 country doctors and 100 doctors from the Perth metropolitan area, Glockner determined that the information needs of rural medical practitioners in Western Australia were not being supported by the major medical libraries. One reason for the lack of support to rural medical practitioners was lack of funds. Suggestions and recommendations for supporting the information needs of rural medical practitioners in Western Australia are discussed in detail.

38. **Goldstrom R.** *Emerging community staff: who? what? where?* NISG Newsletter 1989 Sep;9(3):7-9.

This paper was presented by the Nursing Information Subgroup at the Library Association (U.K.) meeting on May 18, 1989. This is the report of a study by the Nursing Information Subgroup providing recommendations to librarians to make them more aware of the information needs of community nursing staffs. Central points include: community nurses job functions and how nursing libraries can meet nurses' needs; the training requirements of community psychiatric nurses; and the work of practice nurses and community midwives.

39. **Goodspeed RB, Goldfield N.** *Computer assistance with information needs in clinical medicine.* New York State Journal of Medicine 1988 Apr;88(4):183-90.

Goodspeed and Goldfield outline the medical information needs of physicians as patient care, bibliographic information, knowledge bases, expert systems, clinical

databases, and protocol management. Clinical computer programs which support the medical information needs of physicians are reviewed. The advantages and difficulties of using computer technology to assist physicians in meeting their information needs are also discussed. Seven recommendations and key considerations for selecting a computer system to support medical information needs are offered.

40. Grefsheim S, Franklin J, Cunningham D. *Biotechnology awareness study, part 1: where scientists get their information.* Bulletin of the Medical Library Association 1991 Jan;79(1):36-44.

This article (part 1) reviews the findings of a study assessing the information needs of researchers in the field of biotechnology. The study was funded by the National Library of Medicine for the purpose of conducting research regarding the establishment of a National Center for Biotechnology Information. Using both written and in-depth interview survey methods, the Southeastern/Atlantic Regional Medical Library staff and University of Maryland at Baltimore Health Sciences Library staff conducted a survey of nine medical school libraries. The authors evaluate the libraries' resources available to support biotechnology research. For part 2 of this study, see Cunningham, D.

41. Gruppen LD. *Physician information seeking: improving relevance through research.* Bulletin of the Medical Library Association 1990 Apr;78(2):165-72.

This paper addresses how libraries can play a significant role in the teaching of informal continuing education (CE) principles. By teaching information-seeking skills, librarians can change physicians' information-seeking practices. Gruppen's analysis of physicians' information-seeking and advice-seeking behaviors in day-to-day patient care reveals that their needs are not being met and their strategies for seeking information are not effective. He suggests that physician characteristics and practice characteristics influence physicians' preferences for information sources. He stresses that health sciences librarians need to conduct market research to evaluate the specific information needs of their users.

42. Gruppen LD, Wolf FM, Stross JK. *Physician practice characteristics as a context for primary care treatment decision making: a preliminary study.* Academic Medicine 1990 Sep;65(9 Suppl):S9-S10.

In this study, the authors examine how physician practice characteristics affect their medical decision-making process in the course of patient care. Surveys were mailed to a random sample of 2,060 internists and family practitioners in Michigan. Three variables were examined: 1) physicians' confidence in the treatment plan; 2) outside sources referred to during patient care; and 3) whether they would continue patient care involvement if they referred the patient out. The results revealed that physician certification status did influence physicians' information-

seeking behavior. Certified physicians were found to more likely than noncertified physicians to treat patients without seeking additional information. The results suggest "that physician decision-making is influenced not only by physician knowledge and the content and nature of the problem, but also by the context in which physicians confront problems."

43. Gruppen LD, Wolf FM, Van Voorhees C, Stross JK. *Information-seeking strategies and differences among primary care physicians.* Mobius 1987 Jul;7(3):18-26.

The objective of this study was to identify physicians in different subspecialties to determine whether they had any differences in their information-seeking behaviors when faced by a difficult problem. Using a multiple choice questionnaire, ninety-eight internal medicine physicians and 73 family physicians were surveyed about their information preferences when they needed to consult information sources to solve patient care problems. The information sources included were: journals, textbooks, informal consultations with colleagues, consultations with community specialists, and consultations with outside specialists. Transferring the patient to another physician was also suggested. The study indicated that internal medicine physicians prefer consulting the medical literature, while primary care family physicians prefer talking with colleagues and specialists as their primary source of medical information. Gruppen suggests that the results of this research should be applied to the development of continuing medical education courses for physicians.

44. Gruppen LD, Wolf FM, Van Voorhees C, Stross JK. *Information-seeking strategies and treatment decision making.* Proceedings of the Annual Conference on Research in Medical Education 1987;26:203-8.

The focus of this study was to identify the information-seeking strategies primary care physicians use to supplement their knowledge when confronted by a challenging problem. The research examined the impacts the office and/or inpatient setting, the content of the problem, and physician preferences have on physicians' information-gathering strategies. Office-based physicians were found to use textbooks more often than inpatient physicians. Overall, the study found that physicians in different practices use different approaches to answering patient care problems.

45. Gruppen LD, Wolf FM, Van Voorhees C, Stross JK. *The influence of prior experience and confidence on physician preferences for information sources and continuity of care.* Proceedings of the Annual Conference on Research in Medical Education 1986;25:177-82.

In previous studies, Gruppen *et al.*, determined that physicians have differences in information needs, information-seeking strategies, and preferences. The research presented in this paper examines whether one's experiences as a physician

contribute to differences in information source preferences. A mailed survey using four clinical vignettes found "there is little evidence for any influence of experience on the physicians' preferences for information sources." The authors suggest "that experience does not alter the physician's strategy or style of accessing additional information, it just enables him/her to delay or avoid having to seek it." However, the study determined that physicians with limited experience tend to refer to external sources rather than printed sources of information to fill their information needs.

46. **Harris-Wehling J, Morris LC, eds.** Improving Information Services for Health Services Researchers. A Report to the National Library of Medicine. Institute of Medicine. Committee to Advise the National Library of Medicine on Information Center Services in Health Services Research; 1991. 62p.

In 1989, the U.S. Congress charged the National Library of Medicine with the development of an information center for health care technologies, technology assessment and health services research. The Institute of Medicine (IOM) conducted a twelve-month study to identify services that the new NLM information center should be prepared to provide and to determine broad cost estimates required to provide those services. This report presents the findings, conclusions and recommendations of that study. Four of the recommendations relate to improving NLM's infrastructure and one relates to outreach.

47. **Haynes RB.** *Organizing and accessing the literature.* Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):673-86.

This paper was presented in the Organizing and Accessing the Literature Panel at the Symposium on the Future of Information Systems for Medical Sciences. Haynes reviews evidence concerning the information problems of practitioners and the role of biomedical literature in addressing their information needs. Haynes states that "physicians' opinions about their information needs and practices diverge considerably from reality: clinicians vastly underestimate their information needs and vastly overestimate their own efforts to meet these needs." His study indicates that "information needs as 'perceived' by clinical physicians differ markedly from their 'true' needs as deduced from the study of their actual behaviors." Haynes' study also reveals that there is a lack of evidence to show how the biomedical literature meets the information needs of health professionals and whether it has any significant effect on patient care. He proposes methods for organizing and accessing the literature to improve its impact on raising the quality of medical care.

48. **Haynes RB, Ramsden M, McKibbon KA, Walker CJ, Ryan NC.** *A review of medical education and medical informatics.* Academic Medicine 1989 Apr; 64(4): 207-12.

This article discusses various problems and solutions for dealing with the informa-

tion dilemmas of health professionals. Problems cited include keeping up with technological advances and managing information. Solutions suggested for handling the information overload are the teaching of information-seeking skills in medical schools and the implementation of computerized systems to handle medical information. The authors highlight developments in the growing field of medical informatics and evaluate potential solutions for meeting health professionals information needs. Recommendations suggested by the American Medical Colleges for Informatics are reviewed.

49. **Hewins ET.** *Information need and use studies.* Annual Review of Information Science and Technology 1990; 25:145-74.

The Annual Review of Information Science and Technology (ARIST) has published chapters almost every year since 1966 on information needs and use studies. This series of reviews covers all types of user studies including those of health professionals. It includes more than 100 references, covering the period 1986-1989. A section of this chapter is devoted to the literature on information needs in the growing field of medical informatics. This section cites many important studies of information needs and use studies in the health sciences field, in addition to studies dealing with cognitive processes involved in information need and use studies.

50. **Horak EB.** *Clinical librarianship in an era of end users.* Medical Reference Services Quarterly 1987 Summer; 6(2):65-9.

This article suggests that certain aspects of clinical librarianship are being challenged due to end-user access to information. The author raises the question of "whether or not the clinical librarian as intermediary can actually serve end-users, or, are the concepts mutually exclusive?" The author implies that, as the librarian disseminates information, she should also enhance users' knowledge of information sources. In addition, Horak emphasizes that managers of clinical librarian programs should be aware of the health care environment and direct their programs to meet users' needs. Examples of roles for clinical librarians are presented.

51. **Hulkonen DA, Mack BR.** *Physicians' perceptions of library services in a rural state.* Bulletin of the Medical Library Association 1986 Jul;74(3):205-9.

In a study funded by the National Library of Medicine, the Greater Midwest Regional Medical Library staff surveyed underserved or unserved rural health care professionals in hospitals and clinics in South Dakota to determine their medical information needs. The study examined three questions: "1) Did the perceptions of physicians affiliated with the underserved and unserved institutions identified in the survey of 1983 vary significantly from the physicians with adequate resources? 2) Were the underserved/unserved physicians satisfied with their ability to retrieve information? 3) What was their response to proposed library initiatives to improve access to information?" Overall, unserved and

underserved physicians accessed local, state, and regional libraries infrequently. They had little if any use of computerized information sources. Many participants cited reasons for their lack of use of information sources but expressed an interest in gaining access to library services. Physicians' perceptions of their own abilities to acquire information were found to vary significantly. An important finding revealed that although the physicians had similar responses to the questionnaire, physicians' institutional affiliation made a difference in their responses.

52. Huth EJ. *The information explosion*. Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):647-61.

In this paper presented by the Information Explosion Panel at the Symposium on the Future of Information Systems for Medical Sciences, the author suggests that the medical community is not homogeneous and that its individual specializations lead to differences in the kinds of information sought. He argues that health professionals' use or non-use of information sources is directly related to a utility/cost equation. The value of information must be equal to the use of information divided by the cost of information sought. The utility of information is its credibility and usefulness, and the cost of information is based on how accessible it is in addition to its monetary cost. Since the information explosion has made it difficult for managers of published information, notably librarians, and for academic medical personnel to find information to suit their needs, Huth concludes that producers or publishers of information must lower the cost of information to improve its utility.

53. Huth EJ. *The underused medical literature*. Annals of Internal Medicine 1989 Jan;110(2):99-100.

As editor of the Annals of Internal Medicine, Huth identifies obstacles such as time, cost, inconvenience, effort, and inadequacy as reasons for the underuse of the medical literature. He identifies a critical need for the development of a system to better link physicians to the medical literature. He argues that the professional societies are a good source to address the design of new systems to meet physicians' information needs and suggests expert systems as a further means of addressing these needs.

54. Ikpaahindi LN. *Information gathering methods of Nigerian veterinary scientists*. Library & Information Science Research 1985 Apr;7:145-57.

The hypothesis of the National Veterinary Research Institute, Library and Documentation Division was that "Nigerian veterinary practitioners do not have enough information to perform their duties effectively and that, consequently, they depend on informal communication and invisible colleges for information." Using a precoded questionnaire, 100 veterinary researchers in Nigeria were surveyed concerning their information needs, information-seeking strategies, and their

satisfaction with information found. While an information problem truly exists, the findings negate the assumption that veterinary scientists depend on their colleagues as an information source. In fact, they were found to use their colleagues a great deal less than was presumed.

55. *An information digest for health workers in Zimbabwe.* Zimbabwe Librarian 1988 Dec;20(2):74-5.

This commentary is a brief background on health professionals' information needs in Zimbabwe. The Medical Library of the University of Zimbabwe conducted two surveys. The first revealed the information needs of the health professionals outside the Harare metropolitan area or outside the University of Zimbabwe were not being met. The second survey found that health professionals who accessed the University of Zimbabwe medical library felt that the information services were "very satisfactory." The Current Health Information Zimbabwe (CHIZ), the inhouse online system which provides access to the National Library of Medicine's MED-LARS databases, is provided free of charge to health professionals, in accordance with the services provided by the Ministry of Health in Zimbabwe. Response to this online system has been favorable.

56. **Ingram P, McCaleb J.** *Rural community health centers: the information network and professional competence.* North Carolina Medical Journal 1989 Dec;50(12):701-2.

The North Carolina Area Health Education Centers (AHEC) Library and Information Services (LIS) Program was implemented through the Office of Rural Health Services and the National Library of Medicine. The AHEC goal is to offer education and information support services to meet the information needs of physicians and allied health personnel throughout North Carolina. Specific aims are to assist the rural health care community which has a lack of immediate health information resources. It has been suggested that physicians avoid practicing in rural areas because of a lack of information and support services, professional isolation, and inadequate facilities available in those areas. The AHEC supports rural physicians' information needs, offers continuing medical education courses, didactic lectures, consultation services, hands-on presentations, technical support, and medical student clinical rotations, in addition to traditional library and information services.

57. **Kilby SA, Fishel CC, Gupta AD.** *Access to nursing information resources.* IMAGE: Journal of Nursing Scholarship 1989 Spring;21(1):26-30.

In this article, the authors discuss the dilemma of access to current nursing journal articles and books. They suggest collecting and organizing other types of nursing information resources in addition to the traditional sources available. Methods are suggested for gaining control over this information overload. The

authors stress that nurses need to more carefully define and evaluate their information needs, understand the importance of the medical literature, and obtain information-seeking skills training in nursing curriculums. A review and evaluation of nursing literature sources is included.

58. **King DN.** *The contribution of hospital library information services to clinical care: a study in eight hospitals.* Bulletin of the Medical Library Association 1987 Oct;75(4):291-301.

The Illinois Health Science Libraries Research Group was formed to assess the hospital library information services' contribution to the quality of patient care. One hundred seventy-six health care professionals, divided into three groups: physicians, nurses, and other health professionals, were surveyed in eight hospitals. Five areas were investigated. They included the quality and value of information, the impact information had on patient care and case management, and libraries' performance in providing the information. The health care professionals surveyed did not have any differences in their opinions of the contribution of information to patient care or its impact on case management. Responses indicated that information played an important role in patient care decisions.

59. **Kochen M, Cohen L, Wulff Y.** *Information systems and clinical research by residents in internal medicine.* Methods of Information in Medicine 1985;24(2):85-90.

The case group of health professionals studied in this paper were internal medicine residents at the University of Michigan who were required to complete a research project. For many of the residents, this research project was their first experience in clinical research. A questionnaire was designed to identify the residents' current information needs and information-seeking skills. Analysis of the results showed that residents first turned to experienced colleagues, then to textbooks in their field, and finally to online databases as sources of information. The research revealed that the more experience a physician has, the less time he spends in the library or depends upon librarians to answer his information needs.

60. **Kolner SJ, Dalrymple PW, Christiansen R.** *Teaching skills in medical information retrieval to medical students.* Journal of Medical Education 1986 Nov;61(11):906-10.

This article examines the effectiveness of traditional information skills courses taught by librarians to medical students. The objective of the project was to develop an efficient and effective method of teaching information retrieval skills to second-year medical students. The authors studied 45 second-year students at the University of Illinois College of Medicine at Rockford who were required to take a case-oriented, multiple-choice pre-test on information retrieval skills. The tests were designed to evaluate the students' use of Index Medicus, computerized

online literature searching, the card catalog, and various drug information sources. Hospital librarians and medical school faculty were also given the test, and the scores of the two groups were compared. The study revealed that the students surveyed had deficiencies in information retrieval skills. Students who used a self-instruction module after the pre-test had significantly higher scores on the post-test than the students who did not. Based on the results of the study, the authors believe that "self-paced individual learning modules are effective tools for teaching information retrieval skills to medical students."

61. **Korale SR.** *The health system and medical information services in Sri Lanka.* Health Libraries Review 1989 Sep; 6(3):129-40.

This paper describes and evaluates the structure of the health care system of Sri Lanka and the information infrastructure that supports it. The government of Sri Lanka is responsible for the provision of health care services free of charge to all citizens using both Western and indigenous systems of medicine. Responding to a need for a national health information system, the Ministry of Health has taken the initial steps in establishing a primary health care information service. With the assistance of the World Health Organization (WHO), the HELLIS (Health Literature, Library and Information Services) Sri Lanka was implemented. At present 18 libraries have joined the network and strive to meet the information needs of health care practitioners. The article describes the health information users' groups and delineates the deficiencies of the present information services provided to them. The article specifically demonstrates the need for better collections and the "identification of grey literature" produced by the many government agencies.

62. **Leist JC.** *Issues in information dissemination and professional competence.* North Carolina Medical Journal 1989 Dec;50(12):694-6.

The North Carolina Area Health Education Centers (AHEC) Library and Information Services (LIS) Network provides health care professionals with information and educational services to support their information needs. The LIS Network is a cooperative network of health sciences libraries and has been in existence more than 15 years. The North Carolina AHEC Program has nine Library/Information Centers with more than 20 specially trained medical librarians. Each AHEC is affiliated with one of the four medical schools in North Carolina. LIS is a unique information resource which links health professionals with information and resources to support their information needs and professional competence. The AHEC program offers AMA continuing medical education courses in collaboration with the medical schools to all fields of health professionals.

63. **Levene LA.** *Health educators and library resources.* Health Education 1990 Sep-Oct;21(5):25-9.

In this article, Levene discusses the important role a librarian plays in supporting the information needs of health educators. Levene identifies current and accurate information as the most common information need of health educators. Background information about online public access catalogs (OPACs), online databases, and CD-ROM technology and their value to health educators are discussed. The author also identifies and describes basic health science information.

64. **Lockyer J, Jennett P, Parboosingh J, Maes W.** *Raising questions in clinical practice.* Journal of Continuing Education in the Health Professions 1988;8(1):21-6.

Physicians practicing in Calgary and in Southern Alberta who saw at least 25 patients in a typical day were asked to fill out a questionnaire to determine the number of questions that arise to which they do not have an answer. The family physicians reported about one question for every five patients. Physicians were asked to examine the library resources they access and use and to determine whether there is a relationship between the number of questions raised in practice and these resources. In phase two of the study, a mailed questionnaire requested information about office libraries and their use of library resources. A T-test analysis was used to interpret the answers. The findings from the mailed questionnaire differed from the results in earlier research. The limitations, implications, and biases for the results are reviewed.

65. **Lorenzi NM.** *Response to paper by R. Brian Haynes, M.D., Ph.D.: organizing and accessing the literature.* Bulletin of the New York Academy of Medicine 1989 Jul-Aug;65(6):699-703.

Lorenzi, in response to R. Brian Haynes' paper, agrees that information needs in the medical professions are not currently being met and that information professionals must first listen to information requests and then design and develop systems which will meet these demands. The Integrated Academic Management Information System (IAIMS) is one concept that the author suggests could meet some of these needs.

66. **Louis Harris and Associates, Inc.** The future of information systems for the medical sciences. New York: The New York Academy of Medicine; 1987. 271 p.

This study reports the results of a nationwide telephone survey opinion poll of 759 members of the medical community: medical school deans, clinical and basic science faculty members, residents, medical students, health sciences librarians, and office-based physicians. All interviews were conducted between September 1986 and January 1987. The objectives of the poll were to identify health professionals' information needs, evaluate methods for dealing with the medical literature information overload, and examine the role libraries play in medical education.

Analysis of the data collected led to 13 conclusions. An executive summary is included in the report and was published in a special issue of Bulletin of the New York Academy of Medicine (1989 Jul/Aug:644-46).

67. **MacNeil KJ, Algermissen VL, Neill CA.** *Information management skills for veterinary students.* Journal of Veterinary Medical Education 1985 Fall;12(1): 25-6.

The authors report on the outcome of a course on computer literacy in information management skills taught by the Texas A & M University Medical Sciences Library faculty. The University Veterinary Public Health Department perceived a need for second-year veterinary students to learn information management skills. The course taught database content, command language, medical subject headings, and search relevance. According to the results, the class succeeded in teaching information management skills.

68. **McCue JD, Hansen CJ, Gal P.** *Physicians' opinions of the accuracy, accessibility, and frequency of use of ten sources of new drug information.* Southern Medical Journal 1986 Apr;79(4):441-43.

Ten drug information sources were compared for their accuracy, accessibility, and frequency of use to meet the information needs of 49 internists, 42 family practitioners, and 28 surgeons from the Greensboro area in North Carolina. The sources included: Physicians' Desk Reference; pharmacology texts; medical letters; journal articles; professional meetings; hospital pharmacists; colleagues; community pharmacists; drug advertisements; and drug company representatives. Written sources versus verbal sources of drug information and commercial sources versus noncommercial sources were factors considered. "Commercial sources were thought to be less accurate than noncommercial sources, but were used more frequently. Written sources were thought to be more accurate and were preferred over verbal sources of drug information." Physicians' Desk Reference was selected as the most highly utilized tool.

69. **Meadows B, Hamberg CJ.** Health professionals and information: value, variables, variety. Chicago, IL: Medical Library Association, Courses for Continuing Education; 1988. 27 p.

This a continuing education course (CE 680) offered by the Medical Library Association intended for health science librarians. The objective of the course is to determine and examine health professionals' information-seeking skills, information-seeking behaviors, information use, and the value of information to them in order for health sciences librarians to better meet their clients' needs. The course includes sections on: theory, purpose, and scope; proactive programs; issues for further research; and a selective bibliography.

70. **Miller RA, Giuse NB.** *Medical knowledge bases.* Academic Medicine 1991 Jan;66(1):15-7.

This article discusses the importance of medical knowledge bases in the future of medicine and in the field of medical informatics. The authors describe and review medical knowledge bases, stressing their capabilities to meet information needs. They advocate the development and dissemination of medical knowledge bases as tools for clinical practice, research and education.

71. **Milligan GA.** *The information-seeking behaviour of users and non-users of a computerized bibliographic search service.* South African Journal of Library and Information Science 1986 Mar;54(1):34-7.

The Institute for Medical Literature offers access to the MEDLARS databases of the National Library of Medicine. Over a five-year period, 1,400 users accessed the service, although more than 3,500 users were anticipated. Therefore, the Institute conducted an extensive survey through a self-administered questionnaire in order to better identify users' information needs. Using a prospective survey method, a study was conducted by the South African Institute for Medical Literature to evaluate and compare the information-seeking behaviors and information-seeking skills of users and non-users of computerized online search services. Several variables of interest were: type of work activity; the age of the user/ non-users; current awareness methods; use of reference sources; use of colleagues; use of personal reference collections and patterns of use. The study found that users tended to be involved in research, while non-users tended to be involved in patient care practice.

72. **Moore GF.** *Development of information retrieval skills for freshman medical students.* Journal of Medical Education 1988 Nov;63(11):870-2.

In this paper, Moore outlines a method for helping first-year medical students learn how to use information resources more efficiently. He suggests that previous studies and library skills courses have not been effective because there is little skills retention. This course on information-retrieval skills utilizes a specific patient encounter to teach library skills. As a result, students' information retrieval skills were shown to improve. A one-year follow-up study revealed that the students had retained the information retrieval skills learned.

73. **Mularski CA, Nystrom E, Grant HK.** *Developing information-seeking skills in occupational therapy students.* American Journal of Occupational Therapy 1989 Feb;43(2):110-4.

This study describes how the Ohio State University Library and Occupational Therapy Division implemented a library skills course-integrated instruction program for students. Both librarians and faculty members are responsible for

executing and evaluating the curriculum-based course. The authors define course-integrated instruction as the "teaching of library information-seeking skills in the medical curriculum." They report health sciences students must be able to acquire, evaluate and apply information effectively. They suggest health sciences students should be able to use information tools and databases to seek the information they need. This paper reviews the steps that were necessary to make this course a success.

74. National Library of Medicine (U.S.) Board of Regents. Improving health professionals' access to information: report of the National Library of Medicine (U.S.) Board of Regents, Outreach Planning Panel. Bethesda, MD: U.S. Dept. of Health and Human Services, National Institutes of Health; 1989 Aug. 28 p.

This report is the result of serious discussion and the diligent efforts of a panel convened by the National Library of Medicine Board of Regents. Headed by Dr. Michael Debakey, the panel's report outlines the following goals: to increase awareness of information resources; to provide strategies for removing obstacles to information access; and to identify mechanisms to insure maximum application of NLM's information products and services. The panel found that NLM needs to: 1) address the individual health practitioners' needs; 2) network hospitals to national information sources; 3) provide training in medical informatics; and 4) develop a new generation of information products and services.

75. O'Brien D, Procter S, Walton G. *Toward a strategy for teaching information skills to student nurses.* Nurse Education Today 1990 Apr;10(2):125-9.

The library and academic staff of Newcastle upon Tyne Polytechnic and Sunderland Health Authority developed a comprehensive information skills packet for student nurses earning an ENB (English National Board) Diploma in the Nursing Science/ Registered General Nurse Course. The skills package was developed in recognition of the increasing need for nurses to develop active and independent learning skills to support their responsibility for life-long learning. The study/course (ENB Pilot Scheme Course) used a variety of teaching and learning methods to progressively teach information referral, information retrieval, information utilization, and information evaluation. An important goal of the study was to allow student nurses to acquire the information skills needed to satisfy their routine information needs. The value of the course was measured through open-ended questionnaires, interviews, and student assessments. The findings indicate that both students and staff felt this method of teaching information skills was beneficial.

76. Osheroff JA, Forsythe DE, Buchanan BG, Bankowitz RA, Blumenfeld BH, Miller RA. *Physicians' information needs: analysis of questions posed during clinical teaching.* Annals of Internal Medicine 1991 Apr 1;114(7):576-81.

An anthropologist experienced in participant observation recorded verbatim information needs expressed by physicians while caring for patients in four general medical settings. The objective was to develop educational and technological approaches to satisfying clinical information needs. The authors examined the type of information requested. Findings suggest that information needs can be characterized as consciously recognized, unrecognized and currently satisfied. The authors believe that understanding information needs will lead to more effective patient care.

77. **Osiobe SA.** *A study of the use of information sources by medical faculty staff in Nigerian universities.* Journal of Information Science 1986;12(4):177-83.

The objective of this study was to examine the use of sources of information in relationship to health professional specialties. The author's hypothesis was that health professionals used different sources of information depending on their area of specialty. The study consisted of a random sample of faculty members of 10 medical specialties from six selected medical schools in Nigeria. The survey study found the various medical specialties had a "high degree" of similarity in their use of information sources, proving the author's hypothesis incorrect. The findings revealed that scientific and technical journals were the most frequently used sources of information. Monographs and texts were found to be the second most used sources of information. Colleagues and other health professionals were also cited as frequent sources of information. Reference librarians rated very low as sources of information, suggesting that perhaps Nigerian librarians should focus their energies on improving their information services. Osiobe identifies areas that should be considered during library budget allocations and suggests recommendations for improved information services in Nigerian medical libraries.

78. **Osiobe SA.** *Sources of information for biomedical decision-making.* Methods of Information in Medicine 1985;24:225-9.

One hundred seventy-seven health professional faculty members at six Nigerian medical schools were surveyed by questionnaire. The objective was to determine the frequency with which 20 sources of information were used during research, teaching, patient care, and other tasks. Overall, scientific/technical journals were ranked the number one source for answering questions arising during research and patient care. Textbooks/monographs were the preferred choice for instructional purposes. Osiobe argues that health professionals' choice of specific information sources is directly related to the context in which the need occurs.

79. **Osiobe SA.** *Use of information resources by health professionals: a review of the literature.* Social Science and Medicine 1985;21(9):965-73.

This is a review of the literature from 1950-1980 on the use of information resources and the information-seeking behaviors of health professionals. The

influence of several variables, such as form and location of practice, specialty and departmental affiliation, on the use of sources is discussed. The findings revealed that researchers and academic health professionals use library information sources heavily compared to practicing physicians who report low use. Textbooks are consulted most frequently by medical students and pharmacists. Clinical librarians were cited as important information resources when available. This article includes more than 50 references and summaries on the information-seeking and information resource needs of health professionals.

80. **Palchik NS, Wolf FM, Cassidy JT, Ike RW, Davis WK.** *Comparing information-gathering strategies of medical students and physicians in diagnosing simulated medical cases.* Academic Medicine 1990 Feb;65(2):107-13.

A study was conducted using patient management problems (PMP) at the University of Michigan Medical School to examine three medical information-gathering processes: history-taking, physical examinations, and diagnostic studies. The study sample consisted of 175 second-year medical students. The medical students were studied to examine the influence their information-gathering strategies had on their formulations of the differential and the principal diagnoses of 14 simulated patient management problems. The clinician responsible for the medical content of each PMP was asked to make a judgement on the relative importance of information-gathering processes for diagnostic decision making. In general, the students emphasized diagnostic studies as their preferred information-gathering choice, while physicians emphasized patient history as the essential element in gathering information. These judgments were then compared with the factor patterns derived from the students' performances as a basis for this study.

81. **Patrick W.** *The hospital library as nurses' library: a modest proposal for proportional representation.* Bibliotheca Medica Canadiana 1988;9(3):151-4.

Patrick points out that two-thirds of Canada's health care professionals are nurses. Eighty-five percent of Canadian nurses work in hospitals and turn to the hospital library to meet their information needs. The number of nurses almost doubles the number of other health care professionals, yet the information sources available to them are limited. The author suggests the direct outcome of improving nurses' access to information would be better patient care, resulting in shorter patient stays. A second point she makes is that better access and support of nurses' information needs could attract more highly qualified nurses.

82. **Pelzer NL, Leysen JM.** *Use of information resources by veterinary practitioners.* Bulletin of the Medical Library Association 1991 Jan;79(1):10-16.

The authors surveyed randomly-selected veterinary practitioners in 17 states to determine which information sources met their veterinary information needs. The veterinarians most frequently preferred books and other practitioners as sources of

veterinary information. Although they have limited access to veterinary information sources, veterinarians were found to still underuse information resources. The authors surmise that veterinary medical practitioners are graduating from veterinary medical schools without the information-seeking skills necessary to meet their information needs, and, therefore, do not have the information skills necessary to find the information. The authors say the trend toward computerization in veterinary practice has not increased the use of online information services.

83. **Pelzer NL, Leysen JM.** *Library use and information-seeking behavior of veterinary medical students.* Bulletin of the Medical Library Association 1988 Oct;76(4):328-33.

The Iowa State University Veterinary Medical Library conducted a survey of the College of Veterinary Medicine students. The questionnaire focused on four variables: library use, information-seeking behavior, use of printed and computerized sources, and clinical practice sources. Course textbooks and class handouts were the most frequent sources for filling information needs, however many students were not using journal indexes or abstracts. Students who had reported having previous bibliographic instruction were not able to use or identify the information sources any better than the students without previous instruction. An outcome of the study was that course-integrated information-seeking skills training for veterinary medical students is needed before they go into practice in remote locations. Additionally, computerized information services were seen as a way of reducing the information isolation typical in many veterinary practices.

84. **Premssmit P.** *Information needs of academic medical scientists at Chulalongkorn University.* Bulletin of the Medical Library Association 1990 Oct;78(4):383-7.

In this article, the information needs and information-seeking behaviors of academic medical scientists in a developing country were examined. The Chulalongkorn University in Bangkok, Thailand, was selected for the study. Using a self-administered questionnaire, 199 basic and clinical scientists reported on their use or non-use of libraries as information providers, the information needs they have, and the best sources for information. The scientists reported the need to identify up-to-date information as the most frequent reason for using the library resources. The second most important reason was to obtain relevant studies or data. Finding a research topic was cited as the third most prevalent use. Although the Chulalongkorn University scientists rely heavily on information from developed countries, the study concluded that the information needs of scientists in developing countries are different from those in developed countries. The major difference is the high use and regard for the library in less developed countries.

85. Rankin JA, Williams JC, Mishelevich DJ. *Information system linking a medical school with practitioners and hospitals.* Journal of Medical Education 1987 Apr;62(4):336-43.

The Georgia Interactive Network for Medical Information (GaIN) is a network of computers and telephones that link Georgia hospitals with rural Georgia health care practitioners through the Mercer University School of Medicine in Macon, Georgia. The GaIN network was developed by a grant from the National Library of Medicine in order to provide medical information via computer to meet information needs. The aims of the GaIN project are to teach information retrieval skills to the users of the system; to provide timely access to information that is needed in rural practice; to allow colleagues to talk to one another via electronic mail and teleconferencing; and, to provide access to the MEDLARS databases and University resources. Based on their experience with GaIN, the authors make recommendations for planning new information networks.

86. Rector RA. The information needs of nurses specializing in gerontology [Masters Thesis]. Albany, NY: The State University of New York at Albany; 1985. 29 p.

Rector's thesis, submitted in partial fulfillment of an M.L.S. degree, supports the argument that nurses need access to up-to-date information in medical and nursing practice in order to provide quality patient care. The author notes that very little literature on the information needs of nurses was available at the time this article was written. This study examined the information use patterns of a random sample of nurses who specialized in working in the field of gerontology in New York state. The four areas of research interest were general information access, reference usage, journal usage, and other information needs. Results of a questionnaire showed continuing education courses, professional conferences, colleagues and friends to be the most frequent sources of information, in that order. Hospital/medical libraries were the least popular sources of information. Although almost 50 percent of the gerontological nurses had performed an online database search at least once, the remaining 50 percent were not aware of online searching services. The author identifies a need to provide better education to nurses about how to access nursing information.

87. Reidelbach MA, Willis DB, Konecky JL, Rasmussen RJ, Stark J. *An introduction to independent learning skills for incoming medical students.* Bulletin of the Medical Library Association 1988 Apr;76(2):159-63.

Library medical school faculty at the University of Nebraska Medical Center College of Medicine collaborated on the development of a predominantly unstructured course for teaching freshman medical students independent information-seeking skills. The objective of the course was to educate freshman medical students to "retrieve relevant, comprehensive, authoritative information independently

through optimal use of information resources." The emphasis was on the process of retrieving information. Students used a self-paced workbook and divided into small research groups. The workbook contained clinical exercises that the students might encounter in their second year of medical school. Both pre- and post-tests were used to evaluate the usefulness of the course, which proved effective in teaching information-seeking skills.

88. **Rohde NF.** *Information needs.* Advances in Librarianship 1986;14:49-73.

The author provides a comprehensive overview and critical analysis of the concept and study of information needs during the years 1976-1986. Focusing on the methodology used by the cited authors rather than on their conclusions, Rhode presents a scholarly discussion of definitions of the terms information and information needs. A bibliography of more than 50 references to the literature is included.

89. **Royaltey HH.** *The information needs of health care professionals and consumers in developing countries.* Bulletin of the Medical Library Association 1988 Jan;76(1):35-43.

This article discusses the unique differences between the information needs of health care providers in developing countries and their counterparts in the developed world. Describing the health care systems organization, funding, and training of physicians and other health care workers, Royaltey finds that the health care systems in developing countries are poorly organized, have little financial resources and have under-educated health care professionals in comparison to health care systems in developed countries. Health care professionals in developing countries are more diverse in their backgrounds, training, experience and work settings. The author discusses in detail the deficiencies, barriers, and expenses developing countries' health professionals face in obtaining information.

90. **Salasin J, Cedar T.** *Information-seeking behavior in an applied research / service delivery setting.* Journal of the American Society for Information Science 1985 Mar;36(2):94-102.

A nationwide survey of applied researchers, policy makers, and practitioners in the field of rural mental health, was conducted to identify the information sources, the information-seeking behaviors, and the value of the information sources they use. Partially supported by a grant from the National Institute of Mental Health, the survey correlated a number of variables describing respondents' activity in mental health to information-seeking behavior. The findings indicated that physicians had the fewest questions during their information-seeking episodes (ISE) and used the fewest number of sources to meet their information needs. Physicians were found to use colleagues as a source of information much more than the other study groups and placed a higher value on them as an information source. Nurses, on the other hand, reported using the largest number of information sources. In general, it was

found that individuals seldom seek information from outside their own organization, and that when they do, they consult colleagues.

91. **Sandness JG.** *Use of online databases by practicing physicians.* Symposium on Computer Applications in Medical Care 1989:456-8.

This article describes and evaluates the use of the American Medical Association's (AMA) medical information network, AMA/NET. Low use of the AMA/NET system prompted the AMA to conduct a study of the use of the AMA/NET system by practitioners in the Rural Physician Associate Program in underserved areas of Minnesota. The study found four reasons for low use of the system: "lack of time, lack of training, lack of awareness, and never used a computer before." Also, the content of the databases did not meet their information needs.

92. **Shumway JM, Jacknowitz AI, Abate MA.** *Analysis of physicians', pharmacists', and nurses' attitudes toward the use of computers to access drug information.* Methods of Information in Medicine 1990 Mar;29(2):99-103.

The aim of this study was to examine the attitudes of health care professionals toward computerized database sources of drug information. The attitude instrument surveyed 31 physicians, 23 nurses, and six clinical pharmacists affiliated with a university drug information center. Five attitude areas were studied: attitudes toward health care and change, attitudes toward professionals' roles and information seeking, and attitudes concerning end-user computer use. Differences in attitudes of the surveyed health care professionals were found in three of the five areas. The authors identified a resistance to using commercially available drug information online databases, and found that health care professionals are in need of drug information sources that cover the appropriate use of drugs rather than comparative and evaluative information sources. They suggest computerized drug information sources could fill this need.

93. **Simon A, Da Silva J, Soares T.** *Comparative study on information needs of hospital and community pharmacists.* Journal de Pharmacie Clinique 1987;6(4): 593-8.

A comparative study of Portuguese hospital and community pharmacists' information needs was conducted. The hospital pharmacists had more complex information needs and consulted more reference books than the community pharmacists. However, the authors found both the community and hospital pharmacists used the telephone most frequently in answering information needs. Hospital pharmacists took more than 30 minutes to answer information questions; community pharmacists took less than 30 minutes per question.

94. **Stephen-Smith HM.** *A sonata for librarianship.* New Zealand Libraries 1989 Jun/Sept;46(2/3):12-15.

Stephen-Smith compares the information needs of accountants, consulting engineers, lawyers, and pharmacists in order to identify the need for libraries to serve these professions. Two studies were conducted. The first examined the information needs of the four study groups. The second survey attempted to prove that businesses that had libraries were better able to meet professionals' information needs. All respondents felt they had information needs that were not met, and individuals in all four professions were uninformed about library services and had minimal information-seeking skills. Although the engineers and lawyers were found to use libraries more often than pharmacists and accountants, pharmacists were the only study group who had space allocated for an information collection in their office. The study also found that people hoard information and do not share information sources. The author presents recommendations for improving the library system in New Zealand.

95. **Strother EA, Lancaster DM, Gardiner J.** *Information needs of practicing dentists.* Bulletin of the Medical Library Association 1986 Jul;74(3):227-30.

The Louisiana State University Dental Library and School of Dentistry conducted a study on the information needs, information-seeking behaviors and information source preferences of practicing dentists throughout Louisiana. A random sample questionnaire was sent to practicing dentists in Louisiana with a 69 percent return rate. Keeping up with new developments was reported as the most frequent need for information. Patient care was the second most frequent reason. The study found professional colleagues and personal journal collections to be the most often cited source of information primarily due to convenience and secondarily due to reliability. This study supports previous research which found that dentists most frequently used Physicians' Desk Reference (PDR) and colleagues as their sources of information. Recommendations are made on how libraries can better meet the information needs of dentists.

96. **Tabor RB.** *Integrated information for health care.* Information Services & Use 1988;8:13-21.

In this article, Tabor discusses the role of the hospital library in the United Kingdom and the relationship between health care and health information. After examining the information needs of both health care professionals and patients, the author proposes the development of a sophisticated system capable of meeting the information needs of health care professionals in remote locations via computer.

97. **Timpka T, Ekstrom M, Bjurulf P.** *Information needs and information-seeking behaviour in primary health care.* Scandinavian Journal of Primary Health Care 1989 Jun;7(2):105-9.

A comparative study of two groups of general practitioners in Sweden was conducted to analyze their information needs, sources of information, and information-seeking behaviors. Colleagues were found to be the most frequent source of information followed by personal textbooks and libraries. Diagnostic information needs were rated the most prevalent. The authors of this study feel that a reorganization of the information services in Sweden and more communication between information providers and users are desirable. The results of the study were used to design better services and adequate access to information.

98. **Unsworth D.** *In service to meet your research needs.* Professional Nurse 1991 Jan;6(4):213-6.

This article describes the Index to Nursing Research (INR). Produced by the Department of Health, the Index to Nursing Research, is comprised of nursing research by, for, and about nurses in the United Kingdom. Librarians are responsible for producing and maintaining the INR, which is regarded as the major information source to meet nurses' information needs in the UK. Nursing Research Abstracts is another source of nursing information.

99. **Wakeham M.** *Information skills in nurse education.* Nursing Standard 1990 Nov 14;5(8):35-7.

The objective of this article is to show the need for integrating information-seeking skills into the nursing curriculum. Fifty-three nurses responded to an information skills questionnaire. More than half the nurses who responded had no formal training in information-seeking skills. They said that "they had not, in the areas of information seeking and information use, been well prepared, on the whole, to do what is asked of them." The author discusses recommendations and conclusions for future integration of library skills into the nursing curriculum.

100. **Weitzel R.** *Library services for primary health care.* Social Science and Medicine 1991;32(1):51-7.

Focusing on the role of the library in primary health care in developing countries, Weitzel reviews present health information services, types of information needs and the role of the library. Ideas for future information technologies are also discussed. Third World countries face many obstacles in meeting the information needs of their primary health care personnel. Information services outreach is almost impossible in remote rural locations. The author discusses health care information systems in China, the Philippines, Southeast Asia, and Latin American and the Caribbean countries and outlines additional library services and issues.

101. **Westermann ML.** *The health information connection.* Catholic Library World 1985 Feb;56(7):283-6.

In this article, Westermann discusses the services of the Regional Medical Library Program (RMLP). The Regional Medical Library Program is a hierarchical network of health science libraries throughout the United States that provides health care practitioners with timely access to health information resources in order to help meet their information needs. This program was established by the Medical Library Assistance Act in 1965. The network serves to link health practitioners with medical information through the use of computers and library networks. The article reviews the many services of the RMLP and those of the John N. Shell Library at the Nassau Academy of Medicine in New York.

102. **Williamson JW.** *Education in science information management. The foundation for quality assurance in the 1990's.* Quality Assurance Utilization Review 1990 Nov;5(4):121-6.

In this study, the authors surveyed a random sample of American Medical Association physicians and their opinion leaders to determine if they perceive a problem in identifying and obtaining relevant items from the vast amount of medical literature. The results show that these physicians do indeed perceive a need for substantial help in meeting their information needs. Physicians' lack of time was the most frequent reason cited for unmet information needs. The author suggests there are three functions involved in the management of scientific information. They include being able to acquire, evaluate, and apply the scientific information effectively. He also recommends that educating professionals to better manage health science information is the key to improved quality assurance in the future of patient care.

103. **Williamson JW, German PS, Weiss R, Skinner EA, Bowes F 3d.** *Health science information management and continuing education of physicians: a survey of U.S. primary care practitioners and their opinion leaders.* Annals of Internal Medicine 1989 Jan 15;110(2):151-60.

The authors address a problem perceived by the Massachusetts Medical Society in managing scientific information needs and access to information. A self-reported, two-part study was conducted to identify primary care practitioners and their opinion leaders' scientific information needs. Their needs included the development of information-seeking, -dissemination and -use skills. The responses from the two groups were very similar across the board. The volume of scientific literature was rated "unmanageable" and the usefulness of information was questioned by both response groups. In addition, both groups rated lack of time to search for information and the amount of irrelevant material as primary reasons for unfulfilled information needs. The authors conclude that these groups need training to learn how to meet their information needs.

104. **Wood EH, Morrison JL, Oppenheimer PR.** *Drug information skills for pharmacy students: curriculum integration.* Bulletin of the Medical Library Association 1990 Jan;78(1):8-14.

The expanding role of pharmacists as information resources and the complexity of drug information indicates a new approach to pharmacy education is needed. This paper describes the University of Southern California School of Pharmacy's solution to the problem. The Health Sciences Library, in conjunction with the School of Pharmacy, integrated drug information instruction into the four-year Doctor of Pharmacy program. Librarians are involved over the course of the four-year program. Computer education and online retrieval are components of the training. The objective of integrated library education is to instill increasingly more complex information skills (evaluation, organization, application and communication) in all levels of pharmacy students. An overview, background and evaluation of the ten-year-old program are given and some theories on how advances in information technology will affect the program are presented.

105. **Wood FE.** *The use and availability of occupational health information: results of a study.* Journal of Information Science 1985;9(4):141-51.

This article is based on a paper presented at a meeting entitled, Information Sources in Occupational Health, held at the London School of Hygiene and Tropical Medicine. The research for this study was funded by the British Library Research and Development Department. The objective was to evaluate and identify information access, information requirements, and information resources related to or about the occupational health fields in the United Kingdom. Although most of the respondents had access to libraries in their organization, two-thirds responded as follows: they would rather ask for the information than seek it themselves; they did not know where or whom to ask; they seldom used reference services; and they used journals as their main source of information and current awareness. Findings from this study have led to improvements in providing information sources to meet the occupational health practitioners' information needs within the United Kingdom.

106. **Woolf SH, Benson DA.** *The medical information needs of internists and pediatricians at an academic medical center.* Bulletin of the Medical Library Association 1989 Oct;77(4):372-80.

A questionnaire was designed to evaluate the information-seeking behavior and information needs of house-staff and faculty at the Johns Hopkins Hospital in Baltimore, Maryland. The objective of the pilot study was to assess the physicians' attitudes and use of information resources including computerized online medical databases. Although the faculty reported a greater use of the MEDLINE online database, the findings revealed the information needs of both groups were very similar. Many of the findings agreed with the results of previous studies.

107. Worsley A, Worsley AJ. *The nutrition information needs of New Zealand general practitioners.* Nutrition Research 1990;10(10):1099-1108.

Nutrition information and nutrition promotion is a key issue in the New Zealand government. A survey was conducted of 1,000 New Zealand general practitioners' use of sources of nutrition information to study general practitioners' nutrition information needs, the sources of their nutrition information, and views of different sources of available nutrition information. Sixty-one percent of the general practitioners reported their most frequent information source of nutrition information was medical journals. Pamphlets were endorsed by physicians as the number one choice for the form in which nutrition information should be communicated to them and their patients. Medical school training was reported least helpful. Questions about nutrition and allergies were reported as the most frequent needs. The study revealed that general practitioners are lacking in information-seeking skills needed to obtain nutrition information. Recommendations for future improvements and investigation are included.

108. Yeoh J. *Librarian or educator: into the classroom.* Nurse Education Today 1991;11:70-3.

The need for integrating library instruction into the nursing curriculum at St George's Medical School of Nursing in Wandsworth, London, was studied. A Tudor Librarian post was set up to provide an information skills training program for student nurses, faculty, and staff. The Tudor Librarian works with the school of nursing as a member of the teaching staff. The information skills training program at St George's Medical School has proven successful in teaching students and staff how to better meet their information needs.

Assessing the Information Needs of Health Professionals

Chronological Order by Year

1991

1. **Abate MA, Jacknowitz AI, Shumway JM.** Pharmacists' use of online information services. Morgantown (WV): West Virginia University, 1991. Grant R01-LM-0-5189.
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3. **Cunningham D, Grefsheim S, Simon M, Lansing PS.** *Biotechnology awareness study, part 2: meeting the information needs of biotechnologists.* Bulletin of the Medical Library Association 1991 Jan;79(1):45-52.
4. **Demas JM, Ludwig LT.** *Clinical medical librarian: the last unicorn?* Bulletin of the Medical Library Association 1991 Jan;79(1):17-27.
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7. **Miller RA, Giuse NB.** *Medical knowledge bases.* Academic Medicine 1991 Jan;66(1):15-7.
8. **Osheroff JA, Forsythe DE, Buchanan BG, Bankowitz RA, Blumenfeld BH, Miller RA.** *Physicians' information needs: analysis of questions posed during clinical teaching.* Annals of Internal Medicine 1991 Apr 1;114(7):576-81.
9. **Pelzer NL, Leysen JM.** *Use of information resources by veterinary practitioners.* Bulletin of the Medical Library Association 1991 Jan;79(1):10-16.
10. **Unsworth D.** *In service to meet your research needs.* Professional Nurse 1991 Jan;6(4):213-6.
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1990

1. **Bonham MD.** *BIREME: Latin American and Caribbean Health Sciences Information Center.* Bulletin of the Medical Library Association 1990 Apr;78(2):119-23.
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9. **Gruppen LD.** *Physician information seeking: improving relevance through research.* Bulletin of the Medical Library Association 1990 Apr;78(2):165-72.
10. **Gruppen LD, Wolf FM, Stross JK.** *Physician practice characteristics as a context for primary care treatment decision making: a preliminary study.* Academic Medicine 1990 Sep;65(9 Suppl):S9-S10.
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13. **O'Brien D, Procter S, Walton G.** *Toward a strategy for teaching information skills to student nurses.* Nurse Education Today 1990 Apr;10(2):125-9.

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16. **Shumway JM, Jacknowitz AI, Abate MA.** *Analysis of physicians', pharmacists', and nurses' attitudes toward the use of computers to access drug information.* Methods of Information in Medicine 1990 Mar;29(2):99-103.
17. **Wakeham M.** *Information skills in nurse education.* Nursing Standard 1990 Nov 14;5(8):35-7.
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19. **Wood EH, Morrison JL, Oppenheimer PR.** *Drug information skills for pharmacy students: curriculum integration.* Bulletin of the Medical Library Association 1990 Jan;78(1):8-14.
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1989

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